Supplementary Table 1. Behavioural results from pilot experiments and from the post-scanning behavioural data in the second fMRI experiment.

Measure	ANOVA		Pairwise comparisons					
			Slim – muscular			Slim – obese		
			Mean	95% CI	d_z	Mean	95% CI	d_z
Extraversion	Pilot 1:	$F(2,26)=35.03$, $p<.001$, $\eta_p^2=0.73$	-1.65	[-2.27, -1.04]	1.55	2.07	[1.09, 3.04]	1.22
	Pilot 2:	$F(2,44)=34.35$, $p<.001$, $\eta_p^2=0.61$	-1.04	[-1.47, -0.61]	1.04	1.73	[1.11, 2.35]	1.21
	Post fMRI2:	$F(2,46)=61.53$, $p<.001$, $\eta_p^2=0.73$	-1.53	[-2.03, -1.04]	1.30	2.04	[1.26, 2.82]	1.10
Agreeableness	Pilot 1:	$F(2,26)=10.37$, $p=.002$, $\eta_p^2= .44$	1.55	[0.59, 2.52]	0.93	-0.23	[-0.79, 0.33]	0.24
	Pilot 2:	$F(2,44)=15.62$, $p<.001$, $\eta_p^2=0.42$	1.28	[0.73, 1.84]	1.01	-0.41	[-0.97, 0.15]	0.32

Trait	Condition	Statistics						
	Post fMRI2:	$F(2,46)=15.84$, $p<.001, \eta_p^2=0.41$	1.44	[0.85, 2.03]	1.03	-0.20	[-0.79, 0.40]	0.14
Conscientiousness	Pilot 1:	$F(2,26)=5.11$, $p=.031, \eta_p^2=.28$	-0.48	[-1.32, 0.36]	0.33	1.16	[0.21, 2.11]	0.70
	Pilot 2:	$F(2,44)=12.60$, $p<.001, \eta_p^2=0.36$	0.30	[-0.05, 0.64]	0.37	1.22	[0.69, 1.75]	0.99
	Post fMRI2:	$F(2,46)=44.23$, $p<.001, \eta_p^2=0.66$	-0.33	[-0.86, 0.19]	0.27	2.30	[1.78, 2.82]	1.86
Physical Health	Pilot 1:	$F(2,26)=40.13$, $p<.001, \eta_p^2=0.76$	-1.50	[-2.18, -0.82]	1.27	2.60	[1.72, 3.49]	1.70
	Pilot 2:	$F(2,44)=36.10$, $p<.001, \eta_p^2=0.62$	-0.83	[-1.24, -0.41]	0.86	2.34	[1.54, 3.14]	1.27
	Post fMRI2:	$F(2,46)=99.93$, $p<.001, \eta_p^2=0.81$	-0.91	[-1.42, -0.41]	0.76	3.34	[2.73, 3.95]	2.30

Supplementary Table 2. Details for PPI analyses with seed regions taken from the body- and Theory-of-Mind (ToM) localisers for fMRI experiment 1.

		Body-localiser		ToM-localiser			
		EBA	FBA	TPJ	TP	Precuneus	mPFC
Number of subjects (total 26)	Left	-	-	21 (25)	15 (25)	22 (23)	22 (26)
	Right	26 (26)	23 (23)	22 (24)	20 (26)		
Mean MNI coordinate	Left	-	-	-54,-58,16	-51,5,-35	0,-64,28	-15,47,34
	Right	51,-76,-5	48,-40,-23	54,-67,22	57,2,-32		
SD coordinate	X	R=4.13	R=4.01	L=6.56; R=6.53	L=5.63; R=4.20	7.38	9.31
	Y	R=4.49	R=9.12	L=6.42; R=6.50	L=5.98; R=7.43	6.22	6.84
	Z	R=4.24	R=5.70	L=5.58; R=6.06	L=8.32; R=6.09	7.98	15.32

Note: Number of subjects are reported at two thresholds: $p<.001$ and $(p<.01)$.

MNI = Montreal Neurological Institute.

Supplementary Table 3. Details for PPI analyses with seed regions taken from the body- and Theory-of-Mind (ToM) localisers for fMRI experiment 2.

		Body-localiser		ToM-localiser			
		EBA	FBA	TPJ	TP	Precuneus	mPFC
Number of subjects (total: Body = 25; ToM = 24)	Left	-	-	21 (22)	15 (23)		
	Right	25 (25)	18 (20)	22 (23)	18 (23)	16 (24)	18 (24)
Mean coordinate	Left	-	-	-54,-58,16	-51,2,-35	0,-58,28	15,56,16
	Right	48,-76,1	45,-43,-23	54,-67,22	51,5,-29		
SD coordinate	X	R=3.64	R=3.83	L=6.56; R=6.53	L=5.60; R=5.66	6.41	10.98
	Y	R=4.41	R=5.63	L=6.42; R=6.50	L=4.61; R=4.50	5.11	6.86
	Z	R=7.32	R=4.91	L=5.58; R=6.06	L=6.67; R=6.17	7.51	9.45

Note: Number of subjects are reported at two thresholds: $p<.001$ and ($p<.01$).

MNI = Montreal Neurological Institute.

Supplementary Table 4. Functional region of interest data for Experiment 1.

Region	ROI size (voxels)	Average localiser mask size (voxels)	Inter-subject overlap (%)	Percent signal change (SEM)	t	p(fdr)
Slim > Fixation						
Body localiser						
Right EBA	151	98	100	3.15(0.4)	7.87	<0.001
Right FBA	159	26	88	1.7(0.22)	7.87	<0.001
ToM localiser						
Right TPJ	993	265	88	-0.67(0.24)	-2.86	0.999
Left TPJ	985	166	85	-0.89(0.24)	-3.64	0.999
Right TP	169	27	62	-0.51(0.18)	-2.89	0.999
Left TP	160	21	46	-0.16(0.26)	-0.6	0.999
precuneus	1159	189	81	-1.38(0.44)	-3.12	0.999
Dorsal mPFC	609	48	58	-0.48(0.37)	-1.32	0.999
Middle mPFC	493	31	54	-0.63(0.44)	-1.45	0.999
Ventral mPFC	-	-	-	-	-	-
Muscular > Fixation						
Body localiser						
Right EBA	151	98	100	3.42(0.4)	8.48	<0.001
Right FBA	159	26	88	2.15(0.25)	8.73	<0.001
ToM localiser						
Right TPJ	993	265	88	-0.99(0.17)	-5.75	1
Left TPJ	985	166	85	-1.1(0.25)	-4.48	1
Right TP	169	27	62	-0.81(0.18)	-4.55	1
Left TP	160	21	46	-0.15(0.24)	-0.65	1
precuneus	1159	189	81	-1.91(0.35)	-5.43	1
Dorsal mPFC	609	48	58	-0.53(0.29)	-1.84	1
Middle mPFC	493	31	54	-0.78(0.36)	-2.18	1
Ventral mPFC	-	-	-	-	-	-
Obese > Fixation						
Body localiser						
Right EBA	151	98	100	2.91(0.37)	7.83	<0.001
Right FBA	159	26	88	1.71(0.21)	8.26	<0.001
ToM localiser						
Right TPJ	993	265	88	-1.33(0.22)	-5.97	1
Left TPJ	985	166	85	-1.42(0.23)	-6.05	1
Right TP	169	27	62	-0.96(0.15)	-6.52	1

Left TP	160	21	46	-0.42(0.24)	-1.78	1
precuneus	1159	189	81	-2.25(0.41)	-5.53	1
Dorsal mPFC	609	48	58	-0.81(0.37)	-2.21	1
Middle mPFC	493	31	54	-1.13(0.36)	-3.17	1
Ventral mPFC	-	-	-	-	-	-

Abbreviations: ROI = Region of interest; fdr = false discovery rate; EBA = extrastriate body area; FBA = right fusiform body area; TPJ = temporoparietal junction; mPFC = medial prefrontal cortex; ant. Temp. = anterior temporal.

Note: 'ROI size' is the total number of voxels in each ROI based on data from a body perception localiser or a theory-of-mind localiser. 'Average localiser mask size' is the number of voxels that overlap in more than 25% of participants within each ROI. Right EBA, for example, consists of a 151 voxel ROI, with 98 voxels showing overlap in 100% of participants. Analyses were performed on the subset of voxels in each ROI that show overlap in more than 25% of participants. Responses for the ToM localiser in ventral mPFC did not overlap in more than 25% of participants and therefore no data are reported.
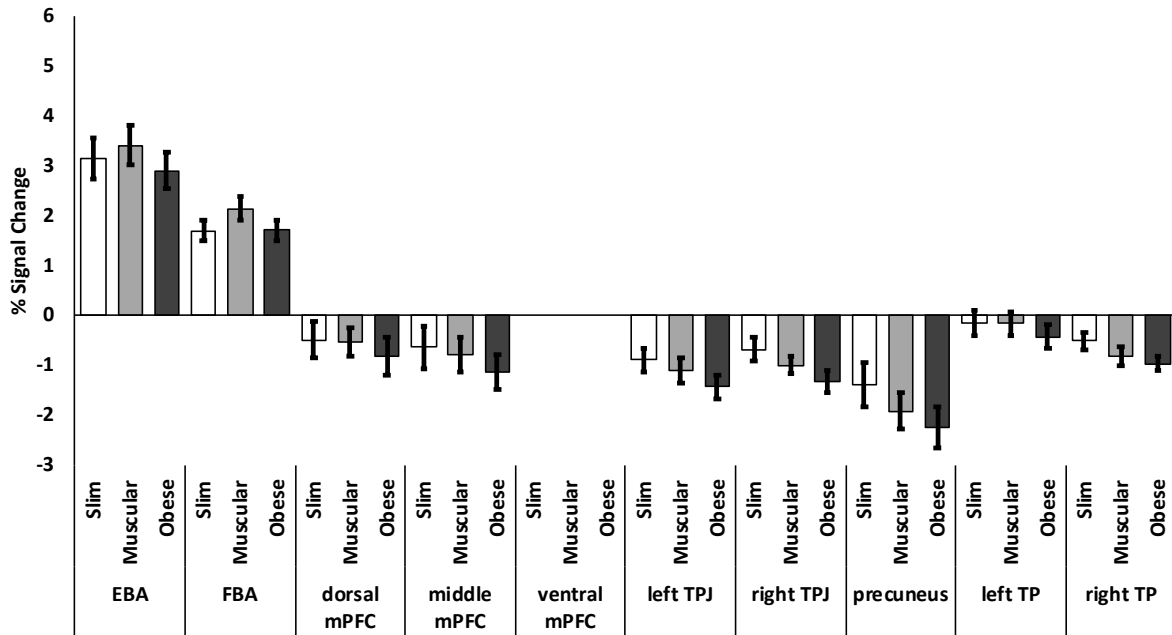
Supplementary Table 5. Functional region of interest data for Experiment 2.

Region	ROI size (voxels)	Average localiser mask size (voxels)	Inter-subject overlap (%)	Percent signal change (SEM)	t	p(fdr)
Slim > Fixation						
Body localiser						
Right EBA	160	61	100	4.98(0.42)	11.72	<0.001
Right FBA	153	14	64	1.64(0.21)	7.69	<0.001
ToM localiser						
Right TPJ	993	295	92	-0.70(0.26)	-2.67	0.993
Left TPJ	985	214	88	-0.21(0.26)	-0.84	0.993
Right TP	151	27	71	-0.36(0.28)	-1.25	0.993
Left TP	169	13	63	0.26(0.34)	0.76	0.993
precuneus	1159	136	67	-0.98(0.41)	-2.38	0.993
Dorsal mPFC	609	70	58	-0.05(0.27)	-0.18	0.993
Middle mPFC	493	50	54	-0.57(0.32)	-1.76	0.993
Ventral mPFC	391	18	46	-0.43(0.68)	-0.63	0.993
Muscular > Fixation						
Body localiser						
Right EBA	160	61	100	5.58(0.43)	13.13	<0.001
Right FBA	153	14	64	1.95(0.28)	7.01	<0.001
ToM localiser						
Right TPJ	993	295	92	-0.74(0.19)	-3.98	1
Left TPJ	985	214	88	-0.22(0.14)	-1.6	1
Right TP	151	27	71	-0.29(0.15)	-1.88	1
Left TP	169	13	63	0.46(0.12)	4.29	0.006
precuneus	1159	136	67	-1.23(0.27)	-4.55	1
Dorsal mPFC	609	70	58	-0.12(0.2)	-0.61	1
Middle mPFC	493	50	54	-0.81(0.28)	-2.94	1
Ventral mPFC	391	18	46	-1.37(0.4)	-3.43	1
Obese > Fixation						
Body localiser						
Right EBA	160	61	100	4.86(0.46)	10.52	<0.001
Right FBA	153	14	64	1.45(0.31)	4.71	<0.001
ToM localiser						
Right TPJ	993	295	92	-0.63(0.26)	-2.46	0.992
Left TPJ	985	214	88	-0.02(0.24)	-0.08	0.992
Right TP	151	27	71	-0.16(0.23)	-0.69	0.992

|						
Left TP	169	13	63	0.76(0.26)	2.93	0.063
precuneus	1159	136	67	-0.9(0.32)	-2.76	0.992
Dorsal mPFC	609	70	58	0.26(0.29)	0.88	0.893
Middle mPFC	493	50	54	-0.54(0.31)	-1.74	0.992
Ventral mPFC	391	18	46	-1.01(0.79)	-1.28	0.992

Abbreviations as Supplementary Table 4.

Supplementary Figure 1. Percent signal change data in functional regions of interest for

Experiment 1.

Supplementary Figure 1. Percent signal change for each body condition compared to fixation

across body network and theory-of-mind network functional regions of interest. No data are

reported for ventral mPFC because less than 25% of participants' localiser data showed

responses in this region. Error bars are standard error of the mean.

Supplementary Figure 2. Percent signal change data in functional regions of interest for

Experigure 2. Experiment 2.
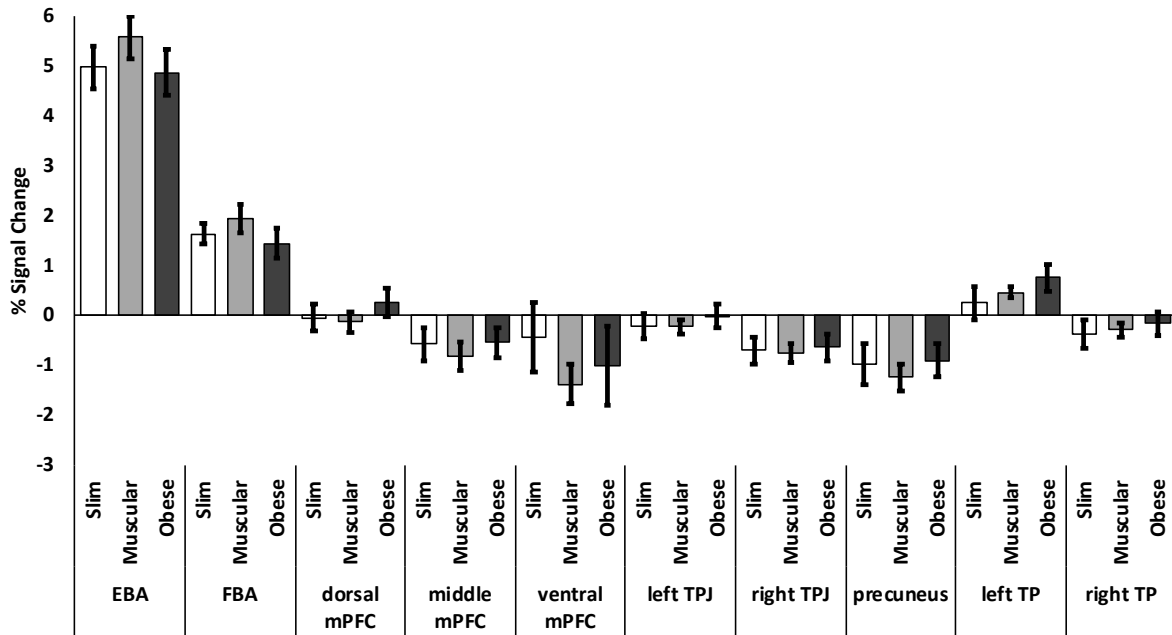
Supplementary Figure 2. Percent signal change for each body condition compared to fixation

across body network and theory-of-mind network functional regions of interest. Error bars are

standard error of the mean.

Supplementary methods

Selection and validation of stimuli: To select and validate stimuli, we ran two behavioural pilot experiments requiring participants to make socially-relevant judgments about silhouettes either presented under unlimited viewing conditions (Pilot 1) or presented briefly (Pilot 2). The participants in pilot experiments did not complete the fMRI study. First, we made series of body images that represented three different body shapes: muscular, obese, and slim. These categories were chosen so that we could compare the perception of bodies where a social evaluation is more extreme (muscular and obese) to a body where a social evaluation is relatively neutral (slim). Because the focus of our research question was on body shape only, we used body silhouettes with heads removed (see Figure 2). Bodies were selected to have a posture that was as neutral as possible (no crossed arms or slouching postures). Images were gathered from various websites, converted into silhouettes, and cropped using GIMP 2.8 (www.gimp.org). To validate that our stimuli were indeed socially evaluated differently, in two separate experiments we asked participants to rate bodies. Stimuli were presented using an iMac computer and Matlab software using Psychtoolbox 3.

In both pilot studies, all bodies were presented upright as well as inverted. Inverted bodies were included to address an additional question (not reported here). All analyses reported here are based on upright bodies. In pilot Experiment 1, 14 participants evaluated 85 upright bodies by rating them on how well the statement matched the image of a body (with 1 being 'completely disagree' and 9 being 'completely agree'). Like prior work on the evaluation of faces (e.g., Kramer and Ward 2010), statements were taken from Big-5 personality measures (Extraversion, Conscientiousness, Agreeableness; Donnellan et al. 2006), as well as physical health (Ware et al., 1996). For instance, to assess physical health, participants rated how well

each body matched the statement "Accomplishes less due to health problems". Participants completed one of two versions of the task. Both versions were identical with the exception of the content of the questions that were asked. In each version, two questions (one positive and one negative) were asked for each of the four measures, resulting in 8 questions. Each question was asked for each body. Ratings for each condition were compared using a repeated-measures Analysis of Variance, and subsequently in two planned comparisons (slim vs. muscular and slim vs. obese). All results are summarised in Figure 2.

In pilot Experiment 2 (n=23), we wanted to find out whether these silhouettes gave rise to a social inference during a brief presentation, which would be more akin to conditions during the fMRI experiment. To do so, each body was presented for 330 ms, after which it was backward masked for 300 ms. The question then remained on screen until a response was made. Participants were asked to assess how confident they were about the answer they gave. Participants completed one of two versions of the task. These were identical, with the exception of how the bodies were paired with the questions. In each version, two questions (one positive and one negative) were asked for each of the four measures, resulting in 8 questions. Each of the bodies was rated on all measures.

Functional region of interest analysis: To perform functional region of interest (fROI) analyses, we used the Group-constrained Subject-Specific (GSS) approach (Fedorenko et al., 2010; Julian et al., 2012; Nieto-Castañón & Fedorenko, 2012). For GSS analyses, the spm_ss toolbox was used, which runs in SPM using Matlab (http://web.mit.edu/evelina9/www/funcloc.html). fROIs were defined using 1) each individual's activation map for the localiser tasks, and 2) group-constraints or masks. These masks refer to a

set of "parcels", which demarcate areas in the brain where prior work has been shown to exhibit activity for the localiser contrasts.

Two sets of fROIs were defined: Body network fROIs that respond to images of bodies more than other object categories (Downing et al., 2001) and ToM-network fROIs that support processes associated with theory-of-mind (Saxe & Kanwisher, 2003). For the body network fROIs, right FBA and EBA were defined using average coordinates taken from our own body localiser data. For example, for GSS analyses in Experiment 1, we used the group average coordinates from Experiment 2's body localiser data. Then for Experiment 2's GSS analyses, we used localiser data from Experiment 1. Therefore, the data used for defining fROIs was independent from the data used for estimating responses (Kriegeskorte et al., 2009). We placed 10mm spheres centred on the average coordinates for FBA and EBA.

For the ToM-network, six parcels were derived from a group-level map from 462 participants for the False Belief > False Photograph contrast (Dufour et al., 2013). These regions included the dorsal, medial, and ventral prefrontal cortex (DMPFC, MMPFC, VMPFC), bilateral temporoparietal junction (TPJ) and precuneus. Bilateral temporal poles were identified in a different manner because they were not identified in isolation in the map produced by Dufour and colleagues (2013). Instead, we identified coordinates for the temporal poles using ToM localiser data in a similar manner to the way body network fROIs were selected. That is, for GSS analyses in Experiment 1, we used the average temporal pole coordinates from Experiment 2's ToM localiser data. For Experiment 2's GSS analysis, we used average temporal pole coordinates from Experiment 1's ToM localiser data. Again, we centred 10mm spheres on the group average coordinates for right and left temporal pole.

For each individual participant, these masks were used to constrain the selection of subject-specific fROIs. For each individual and within each body fROI, voxels that passed a threshold (p< 0.001, uncorrected) in the Bodies > Cars contrast were defined as that individual's fROI. Similarly, for each ToM fROI, the Belief>Photo contrast was used and voxels that passed the same threshold were selected in each individual participant separately. All runs of the localiser tasks were used to define fROIs in each individual. Percent signal change (PSC) values were extracted from all fROIs and responses were estimated for three separate contrasts: Slim > Fixation; Muscular > Fixation; Obese > Fixation. As implemented in GSS, statistical tests were performed on the PSC values using standard Student's t-tests. One-sample t-tests were performed to investigate the response of the body and ToM network fROIs. False Discovery Rate (FDR) multiple comparison correction (p<.05) was used to correct for the number of fROIs in each functional network. For Experiment 1, the fROI results are reported in Supplementary Table 4 and Supplementary Figure 1 and for Experiment 2 the fROI results are reported in Supplementary Table 5 and Supplementary Figure 2. The data are also made available online to guide future experiments (https://osf.io/p4sbr/).

Supplementary References

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